ISO/FDIS 18127~~:2025(en)~~

ISO/TC 147/SC 2

Secretariat: DIN

Date: 2025-~~04-25~~08-20

Water quality — Determination of adsorbable organically bound fluorine, chlorine, bromine and iodine (AOF, AOCl, AOBr, AOI) — Method using combustion and subsequent ion chromatographic measurement

Qualité de ~~l'eau~~l'eau — Dosage des composés organiques adsorbables contenant du fluor, du chlore, du brome et de ~~l'iode adsorbables liés organiquement~~l'iode (AOF, AOCl, AOBr, AOI) — Méthode ~~en utilisant la~~de combustion ~~et la mesure ultérieure~~suivie d'un mesurage par chromatographie ionique

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*~~,~~, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 230, *Water analysis,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Adsorbable organically bound fluorine, chlorine, bromine or iodine are analytical convention parameters used to monitor water quality. They represent the sum of organically bound fluorine, chlorine, bromine and iodine that can be adsorbed on activated carbon under specified conditions and, if the sample has not been filtered, can also be attached to or contained in suspended substances.

In contrast to the ~~AOX~~adsorbable organically bound halogen (AOX) method according to ISO 9562, this method can be applied to determine the sum of organofluorine compounds in addition to the determination of organically bound chlorine, bromine and iodine and detected halogen-specific separately.

The method is carried out by combustion ion chromatography (CIC).

Procedures for each separate parameter are described in Annex A, Annex B, Annex C and Annex D.

Alternatively, the adsorption of the organic substances contained in the water sample on activated carbon can also be carried out by the shaking method (see Annex E).

Samples with a high content of suspended solids can be analysed using the shaking method (see Annex E).

Samples with a high content of inorganic halides can be analysed using the solid phase extraction (SPE) method (see Annex F).

Results for samples analysed according to Annex E (shaking procedure) or Annex F (SPE procedure) can differ significantly from those of the method specified in the main part.

With some waters, interference can occur that cannot be eliminated. These waters cannot be measured with the method.

The AOCl, AOBr and AOI results according to Annex B, Annex C and Annex D can also be reported as adsorbable organically bound halogen determined by combustion ion chromatography (CIC-AOX) (see Annex J).

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WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

1 Scope

This document specifies a method for the determination of organically bound halogens fluorine, chlorine, bromine and iodine which are adsorbable on activated carbon. Adsorption takes place on activated carbon packed in columns.

The method is applicable for the determination of:

— ≥ 2 µg/l AOF, expressed as F;

— ≥ 10 µg/l AOCl, expressed as Cl;

— ≥ 1 µg/l AOBr, expressed as Br;

— ≥ 1 µg/l AOI, expressed as I.

The method is applicable for the determination of adsorbable organically bound fluorine, chlorine, bromine or iodine in water, e.g. in groundwater, surface water, bank filtrate, drinking water, aqueous eluates, cooling water and wastewater.

The working range is limited by the capacity of the activated carbon, the process blank and the capacity of the chromatographic separation column. Sample dilution into the working range can be required.

The range of application can be extended to lower concentrations with lower process blanks e.g. using low blank active carbons.

The method can also be applied for samples containing suspended solids. Halogens adsorbed on the suspended solids (e.g. undissolved halides) are also determined, too. Filtration of the sample prior to analyses using a membrane filter (0,45 µm) allows the separate determination of dissolved adsorbable and particulate bound fractions of organically bound fluorine, chlorine, bromine or iodine.

Results from an international interlaboratory trial are presented in Annex KThe recovery of some polar and hydrophilic compounds, e.g. trifluoroacetate or monochloroacetate or volatile compounds is incomplete.

Procedures for each separate parameter are described in normative Annex A, Annex B, Annex C and Annex D.

Alternatively, the adsorption of the organic substances contained in the water sample on activated carbon can also be carried out by the shaking method (see Annex E).

Samples with a high content of suspended solids can be analysed using the shaking method (see Annex E).